[0001]
[Field of the Invention]This invention relates to a data transfer method. It is related with the method of transmitting multimedia data quality between the transmitting information device and information reception device which were especially connected via the share bus type wireless network.
[0002]
[Description of the Prior Art]As a method of transmitting multimedia data with high quality between the transmitting information connected via the share bus type network, and with an information reception device (it is called the following "transmission node" and a "receiving node"), the "real-time-communication method" (Japanese Patent Application No. No. 75018 [nine to]) is known.
[0003]In a share bus type network, when the total traffic volume which flows on a transmission line goes up more than fixed, there is the characteristic that the multimedia data quality which flows on a transmission line deteriorates. Quality multimedia data transfer in a share bus type network is realized by controlling by Japanese Patent Application No. No. 75018 [nine to] so that the total traffic volume which flows on a transmission line does not become more than fixed. The outline of a control system of guaranteeing the total traffic volume which flows on the above-mentioned transmission line not becoming more than fixed is shown below.
[0004]In Japanese Patent Application No. No. 75018 [nine to], every one "band management server" per transmission line of a share bus type network which manages the traffic volume of a transmission line is provided.
[0005]A band management server divides the traffic volume of a transmission line into real time communication and non-real time communication, and manages it. The "real time communication" said here refers to the communicative thing which needs to perform transmission which followed strictly the amount of zones which is represented by the multimedia data transfer etc., and which application requires. On the other hand, "non-real time communication" refers to the communication in which restrictions of the amount of zones represented by FTP do not exist.
[0006]Each node which is going to transmit a packet to a transmission line regardless of real time communication and non-real time communication transmits the control packet for performing a band assignment demand to a band management server, before starting the transmission. In requiring the zone for real time communication, it also includes the amount of zones to demand in a control packet collectively.
[0007]The band management server which received the band assignment demand from each node assigns a zone in the following procedures.
[0008]1) Give priority to the band assignment for real time communication.
[0009]2) Assign the remainder which lengthened the zone secured to real time communication by 1 from the maximum traffic volume on a transmission line to permit uniformly to the node which is demanding the zone for non-real time communication as a zone for non-real time communication.
[0010]A band management server returns the control packet containing the assigned amount of zones to each node. Each node which received the above-mentioned control packet performs packet transmission at the rate which is strictly in agreement with the amount of zones contained in a control packet.
[0011]In the above-mentioned method, a band management server performs band

assignment to each node so that the total traffic volume which flows on a transmission line may not become more than fixed. Each node performs packet transmission at the rate which is strictly in agreement with the assigned zone. The result can guarantee that the total traffic volume which actually flows on a transmission line does not become more than fixed, either.
[0012]
[Problem(s) to be Solved by the Invention]If the method of Japanese Patent Application No. No. 75018 [nine to] is used, the debasement of the multimedia data based on the total traffic volume which flows through a share bus type network becoming more than fixed can be prevented.
[0013]However, by the above-mentioned method, delivery of the quality multimedia data in a share bus type wireless network is unrealizable. This reason is shown below.
[0014]There are the following features in communication in a share bus type wireless network.
[0015]1) The quality of a transmission line is bad. Therefore, transmission errors occur frequently. In order to prevent the packet lack by a transmission error, a network driver will resend a packet, if a transmission error is detected.
[0016]2) The quality (probability of occurrence of a transmission error) of a transmission line changes with time.
[0017]For the above-mentioned feature, resending of A usual multimedia data transfer B multimedia data is intermingled, and, as for the multimedia data transfer on a share bus type wireless network, the ratio of the above-mentioned AB changes with time. However, in the method of Japanese Patent Application No. No. 75018 [nine to], each node performs packet transmission so that a fixed quantity of rates of the total of the above-mentioned AB may become the following. Therefore, if the maximum of the above-mentioned rate is too small, the time which cannot be taken enough generates the rate of the above-mentioned A, and a quality multimedia data transfer cannot be realized. A zone will be wasted if the maximum of the above-mentioned rate is too large.
[0018]In this invention, the data transfer method realized holding [quality multimedia data transfer] down waste for a zone also in a share bus type network with the feature of above-mentioned 12 is provided.
[0019]
[Means for Solving the Problem]In order to solve an aforementioned problem, this invention provides a data communication method with the following features.
[0020]1) Even per transmission line provides a server (band management server) which assigns a zone to each transmission node that the total traffic volume which flows on a shared type wireless network should be made below fixed.
[0021]2) Each transmission node which is going to transmit a packet to a transmission line requires band assignment of a band management server. Three kinds an object for real time communication, an object for resending of real time communication, and for non-real time communication exist in a zone which requires assignment.
[0022]3) A transceiver node performs a retransmitting process only about a real-time-communication packet. Specifically, a transmission node gives data in which it is shown whether the packet concerned is an object for real time communication or it is an object for non-real time communication, and a sequence number to a transmitting packet. The packet concerned is a packet for real time communication, and a receiving node transmits

request sending to a transmission node, only when lack of a sequence number is detected.
[0023]4) A transmission node measures occurrence frequency of request sending from a receiving node. According to the occurrence frequency, a change in a zone for resending of real time communication required of a band management server is required. On the other hand, a zone for real time communication is not made to fluctuate.
[0024]
[Embodiment of the Invention]An embodiment of the invention is shown below.
[0025]Drawing 1 is the figure showing the system configuration assumed by an embodiment of the invention.
[0026]In this system, communication which passed the wireless network (100) between the transmitting application (104) which operates on a transmission node (102), and the receiving application (105) which operates on a receiving node (103) is performed. The band management server (101) is also operating on this wireless network. A band management server performs band assignment to each transmission node so that the total traffic volume which flows on a network may not become more than fixed.
[0027]Transmitting application and receiving application perform real time communication which used RT (real time) communication protocol stack (106), and two kinds of communications of non-real-time-communication ** which used the NRT (non-real time) communication protocol stack (107). The packet hereafter sent and received by "RT packet" and the NRT communication protocol stack in the packet sent and received by RT communication protocol stack is called a "NRT packet." "RT packet" may be resent so that it may mention later. RT packet currently resent is hereafter called a "resending packet", and the other RT packet is called "the usual RT packet."
[0028]RT communication protocol stack and a NRT communication protocol stack do not transmit a packet to a wireless network directly. Instead, the Request to Send of RT packet and the Request to Send (it abbreviates to "RT Request to Send" and a "NRT Request to Send" hereafter) of a NRT packet are published to a transmitting control module (108). A transmitting control module communicates with the band management module (109) on a band management server, and performs issue of a band assignment demand, and acceptance of a band assignment result. And the packet quantity sent out on a network is adjusted according to a band assignment result.
[0029]A transmitting control module does not transmit immediate data to a wireless network, either. RT Request to Send and a NRT Request to Send are instead published to a sequence number grant module (110). A sequence number grant module sends out the packet concerned to a wireless network, after giving a sequence number to a packet.
[0030]In a receiving node (103), a sequence number inspection module (111) receives the packet which received from the wireless network. A sequence number inspection module inspects the sequence number given to the packet which received, and investigates whether lack of a packet has occurred. If the packet is not missing, advice of receipt will be published to RT communication protocol stack and a NRT communication protocol stack. If lack of a packet has occurred, it will restrict, when RT packet is missing, and request sending will be published to a sequence number grant module.
[0031]The sequence number grant module (110) which received request sending acts as a forward of the request sending to a transmitting control module (108). The transmitting control module has secured the zone for resending packets other than the usual RT packet and a NRT packet. The amount of zones concerned is made to fluctuate according to the

acceptance frequency of request sending. This increase and decrease are realized by publishing the zone update request for resending to a band management module.
[0032]In the above-mentioned system, the zone for the usual RT packet, a NRT packet, and resending packets is secured independently. Therefore, it is not concerned with the occurrence frequency of request sending, but can guarantee that the transmission rate of the usual RT packet is constant. Therefore, a quality multimedia data transfer is realizable. The zone for resending packets is made to fluctuate according to the acceptance frequency of request sending. A retransmitting process is not performed about a NRT packet. Therefore, even if the quality of a transmission line changes with time, a zone can be used effectively.
[0033]It attaches hereafter in detail [the "band management module" in drawing 1, a "transmitting control module", a "sequence number grant module", and a "sequence number inspection module"], and explains in order.
[0034]A band management module (109) is started by receiving a band assignment demand or the band assignment update request for resending from a transmitting control module (108). The band management module which received the mentioned demand realizes management of band assignment by updating a band assignment table (300). Hereafter, it attaches and states to the details of operation of a band management module using drawing 4 from drawing 2.
[0035]In order to perform issue of a band assignment demand, issue of the band assignment update request for resending, and the notice of a band assignment result, the format of the packet sent and received between a transmitting control module (108) and a band management module (109) is shown in drawing 2.
[0036]This packet consists of each field of a MAC header (201), a transmission node MAC Address (202), a receiving node MAC Address (203), a command (204), zone classification (205), bandwidth (206), and the bandwidth (207) for resending as illustrated.
[0037]When a MAC header field sends out a packet to a wireless network (100), it stores the data which should certainly be given.
[0038]The data which can distinguish whether the packet concerned is a packet which performs "a band assignment demand", it is a packet which performs "the zone update request for resending", or it is a packet which notifies a "band assignment result" is stored in the command field.
[0039]In the case of the packet which performs "a band assignment demand" and "the zone update request for resending", the MAC Address of the transmission node which has published the demand concerned is stored in a transmission node MAC address field. The data which can distinguish whether it is requiring whether to demand "the zone for RT packets" for "the zone for NRT packets" is stored in the zone classification field. In requiring "the zone for RT packets", it stores in the bandwidth field and the bandwidth field for resending the data in which it is shown the bandwidth of which is required of the "usual RT packet" and "resending packets", respectively. The MAC Address of the node which receives RT packet which transmits to a receiving node MAC address field using the above-mentioned bandwidth is stored. On the other hand, in requiring "the zone for NRT packets", a receiving node MAC address field, the bandwidth field, and the bandwidth field for resending do not make a meaning.
[0040]In notifying a "band assignment result", it stores the MAC Address of an usable

transmission node in a transmission node MAC address field for the zone concerned. The data which distinguishes whether use of "the zone for RT packets" or "the zone for NRT packets" is permitted is stored in the zone classification field. The bandwidth permitted as the "usual zone for RT packets" and "a zone for NRT packets" is stored in the bandwidth field. In permitting use of "the zone for RT packets", it stores in a receiving node MAC address field the bandwidth which permits the MAC Address of a receiving node to the bandwidth field for resending as an object for resending packets. In permitting use of the zone for NRT packets, not mentioned both the fields have a meaning.

[0041]The composition of a band assignment table is shown in drawing 3.

[0042]This table consists of each field of zone classification (301), a transmission node MAC Address (302), a receiving node MAC Address (303), bandwidth (304), and the bandwidth (305) for resending as illustrated.

[0043]The data which can distinguish whether the entry concerned is a zone "for RT packets" and whether it is a zone "for NRT packets" is stored in the zone classification field.

[0044]The zone of the entry concerned can be assigned to the transmission node field, and the MAC Address of a ******** transmission node is stored in it.

[0045]The receiving node MAC Address of the packet which uses the zone of the entry concerned is stored in the receiving node field.

[0046]The information about the bandwidth currently assigned is stored in the bandwidth field.

[0047]The bandwidth field for resending has a meaning, only when the entry "object for RT packets" zone concerned is shown, and the zone for resending packets is stored.

[0048]The operation flow of a band management module (109) is shown in drawing 4.

[0049]A band management module will perform Step 401 first, if the packet of the format shown in drawing 2 is received. It is inspected whether at Step 401, the data in which "a band assignment demand" is shown is stored in the command field (204). Step 403 is performed, if are stored and Step 402 cannot be stored.

[0050]A new entry is added based on the information stored in the packet which received at Step 402. That is, a new entry is created and the data stored in the field where the packet which received in each field (301-305) of the "zone classification", a "transmission node MAC Address", a "receiving node MAC Address", "bandwidth", and "the bandwidth for resending" corresponds is stored. If it ends, it will jump to Step 405.

[0051]It is inspected whether the data in which "the zone update request for resending" is shown is stored in the command field (204) of the packet which received at Step 403. If are stored, and not stored, abnormal termination of Step 404 will be carried out.

[0052]The contents of the corresponding entry are updated based on the information stored in the packet which received at Step 403 by Step 404. That is, the data stored in the field where the packet which received the bandwidth field (305) for resending of the entry concerned corresponds is stored.

[0053]Zone classification re-calculates the bandwidth of the entry which is NRT among the entries stored in the band assignment table at Step 405. By this re-calculation, the total of the bandwidth registered into the band assignment table can always be fixed.

[0054]The packet which notifies the band assignment result corresponding to the entry added and updated by Step 402 and Step 404 at Step 406 and the entry for which NRT is stored in the zone classification field is generated. The data in which it is specifically

shown that it is a packet which performs a "band assignment result notice" to one command field (204), 2) Generate the packet holding the data stored in the field corresponding to a transmission node MAC Address (202), a receiving node MAC Address (203), zone classification (204), bandwidth (205), and the bandwidth (206) for resending in the entry concerned. A mentioned packet creates only the number of applicable entries.

[0055]Transmitting the packet created at Step 406 by Step 407 to the node specified in a transmission node MAC address field, a band management module completes processing.

[0056]Next, operation of a transmitting control module (108) is explained using drawing 5 to drawing 2 and drawing 7 from drawing 1.

[0057]As shown in drawing 1, a transmitting control module, 1) Acceptance of RT Request to Send from the acceptance 3RT communication protocol stack (106) of the band assignment result from the acceptance 2 band-management module (109) of the band assignment demand from RT communication protocol stack (106), It drives ignited by acceptance of the NRT Request to Send from a NRT communication protocol stack (107), and acceptance of the request sending from a sequence number grant module. It attaches in detail [operation of the transmitting control module in each above] hereafter, and explains.

[0058]First, it explains per operation at the time of receiving a band assignment demand from RT communication protocol stack (106).

[0059]The band assignment demand "for RT packets" is driven ignited by issue of the band assignment demand from transmitting application (104) and RT communication protocol stack (106) (the issue opportunity of the band assignment demand "for NRT packets" is mentioned later). The band assignment demand "for RT packets" is independently performed for every group of a transceiver node. Transmitting application specifies a receiving node, the required amount of zones for the usual RT packets, and the amount of zones for resending packets. A transmitting control module generates a packet with the format shown in drawing 2, and transmits to a band management module (109). Under the present circumstances, in a 1 transmission-node MAC address field (202). The MAC Address of a self-node in a 2 receiving-node MAC address field (203). Transmitting application the MAC Address of the specified receiving node in three command fields (204). The data in which it is shown that it is a packet which performs "a band assignment demand" in 4 zone classification field (205). The amount of zones to which transmitting application specified the data in which it is shown that it is "a zone for RT packets" as 5 bandwidth field (206) and the bandwidth field (207) for resending is stored.

[0060]Next, when a band assignment result is received from a band management module (109), it explains per.

[0061]If the above is received, a transmitting control module will update a band management table (501). This table manages the bandwidth for the usual RT packet to which use of the self-node is permitted, a NRT packet, and resending packets.

[0062]The format of a band management table is shown in drawing 6. This table as illustrated The zone classification field (601), a receiving node MAC address field (602), It consists of the bandwidth field (603), the bandwidth field (604) for resending, the transmitting number-of-bytes field (605), the resending number-of-bytes field (606), and the resending rate re-calculation counter field (607).

[0063]The data in which the entry concerned can distinguish whether the information about which zone "the object for RT packets" and "for NRT packets" is shown is stored in the zone classification field.
[0064]Only when the data in which the zone "for RT packets" is shown is stored in the zone classification field, it has a meaning in a receiving node MAC address field. The receiving node MAC Address of the packet transmitted using the zone concerned is stored in this field.
[0065]The bandwidth of the zone concerned is stored in the bandwidth field.
[0066]The bandwidth field for resending has a meaning, only when the data in which the zone "for RT packets" is shown is stored in the zone classification field. The bandwidth for resending packets is stored in this field.
[0067]The transmitting number-of-bytes field has a meaning, only when the data in which the zone "for RT packets" is shown is stored in the zone classification field. The total of the number of bytes of the packet transmitted using the zone concerned is stored in this field.
[0068]The resending number-of-bytes field has a meaning, only when the data in which the zone "for RT packets" is shown is stored in the zone classification field. The total of the number of bytes of the packet which performed resending among the packets transmitted using the zone concerned is stored in this field.
[0069]The resending rate re-calculation counter field has a meaning, only when the data in which the zone "for RT packets" is shown is stored in the zone classification field. The time to re-calculation **** timing is stored in this field in the resending rate of the zone concerned.
[0070]A transmitting control module (108) receives a band assignment result by the packet of the format shown in drawing 2. A transmitting control module searches whether the entry the zone classification field (205) of a receive packet and whose receiving node MAC Address (203) correspond exists. When it exists, the value of the bandwidth field (603) of the entry concerned and the bandwidth field (604) for resending is updated to the value stored in the field where the packet which received corresponds. It creates a new entry, in not existing. In this case, the value of the zone classification field (601), a receiving node MAC address field (602), the bandwidth field (603), and the bandwidth field (604) for resending is copied from the field where the packet which received corresponds. The transmitting number-of-bytes field (605) and the resending number-of-bytes field (606) are initialized to 0. The resending rate re-calculation counter field (607) is set as an initial value (time interval which re-calculates a resending rate).
[0071]Finally, RT communication protocol stack (106) to RT Request to Send is explained from acceptance and a NRT communication protocol stack (107) per operation at the time of receiving request sending for a NRT Request to Send from acceptance and a sequence number grant module (110).
[0072]As shown in drawing 5, queuing of the above-mentioned demand is once carried out to RT Request-to-Send cue (504), request sending cue (503), and NRT Request-to-Send cue (502).
[0073]A transmitting control module (108) is driven periodically and takes out the demand (packet) by which queuing is carried out to the above-mentioned cue. And the zone update request for band assignment demand resending to the issue 3 band-management module (109) of the RT Request-to-Send request sending NRT Request to

Send to the reference 2 sequence-number grant module (110) of 1 band management table (501) is published if needed.
[0074]The operation flow of the transmitting control module at the time of driving periodically, as shown above is shown in drawing 7.
[0075]The dequeue of the packet group of the bandwidth registered into the bandwidth field (603) of the band management table (501) from RT Request-to-Send cue (504) at Step 701 is carried out. RT Request-to-Send cue exists for every receiving node. The above-mentioned processing is performed to all the Request-to-Send cue.
[0076]Next, RT Request to Send of the packet group which carried out the dequeue at Step 701 to the sequence number grant module (110) by Step 702 is published.
[0077]In Step 703, the dequeue of the packet group of the bandwidth registered into the bandwidth field (604) for resending of the band management table (501) is carried out from request sending cue (503). Since request sending cue also exists for every receiving node, the above-mentioned processing is also performed to all the request sending cue.
[0078]Furthermore by Step 704, request sending of a packet group is published to a sequence number grant module (110) to a dequeue at Step 703.
[0079]In Step 705, the value of the transmitting number-of-bytes field (605) of a band management table (501) and the resending number-of-bytes field (606) is updated first. Renewal of the above is performed only about the entry which shows the zone for RT packets. The total of the size of a packet group which carried out the dequeue at Steps 701 and 703, respectively is added to each entry which shows the zone for RT packets. Furthermore, the decrement of the value of the resending re-calculation counter field (607) of a band management table (501) is carried out.
[0080]At Step 706, it is inspected whether the value of the resending re-calculation counter field is 0. If it is 0, if it is not 0, to Step 707, it will jump at Step 708.
[0081]At Step 707, the zone update request for resending is published to a band management module (109). Issue of a mentioned demand is performed by transmitting the packet of the format shown in drawing 2 to a band management module. Under the present circumstances, the MAC Address of a self-node is stored in a 1 transmission-node MAC address field (202).
[0082]2) Store in a command field (204) the data in which "the zone update request for resending" is shown.
[0083]3) Store in a receiving node MAC address field (203), the zone classification field (205), and the bandwidth field (206) the value of the entry to which a band management table corresponds.
[0084]4) Store a band management table in the bandwidth field (207) for resending at origin in quest of the value which can be found by the following formulas.
[0085]
[Equation 1](Value of the bandwidth field) x(value of the resending number-of-bytes field)/(value of the transmitting number-of-bytes field)
The transmitting number-of-bytes field (605) of a band management table (501) and the resending number-of-bytes field (606) are reset to 0. The resending rate re-calculation counter field (607) is reset to an initial value.
[0086]It is inspected whether an entry for which data in which it is shown that it is a zone for NRT packets is stored in the zone classification field (601) at Step 708 exists. If it exists and Step 710 will not be used, it jumps to Step 709.

[0087]In Step 709, a band assignment demand for NRT packets is published to a band management module (109). Also in this case, a packet of a format shown in drawing 2 is transmitted to a band management module. Under the present circumstances, a MAC Address of a self-node is stored in a 1 transmission-node MAC address field (202).
[0088]2) Store in a command field (204) data in which "a band assignment demand" is shown.
[0089]3) Store in the zone classification field (205) data in which it is shown that it is a zone for NRT packets.
[0090]In Step 710, the dequeue of the packet group of bandwidth registered into the bandwidth field (603) of a band management table (501) is carried out from NRT Request-to-Send cue (502).
[0091]And a NRT Request to Send of a packet group which carried out the dequeue at Step 710 to a sequence number grant module by Step 711 is published.
[0092]Next, details of operation of a sequence number grant module (110) are explained using drawing 13 from drawing 8.
[0093]When RT Request to Send / request sending / NRT Request to Send is received from 1 transmitting control module (108) and request sending is received from 2 sequence number inspection module (111), a sequence number grant module (110) is started as drawing 1 showed. hereafter, in each above, it can set -- it of operation detailed per explains.
[0094]First, it explains per [at the time of receiving RT Request to Send / request sending / NRT Request to Send from a transmitting control module (108)] operation.
[0095]A sequence number grant module (110) manages a sequence number which should be given to a packet using a sequence number management table (800) shown in drawing 8. A sequence number grant module determines RT packet Request to Send and a sequence number which should be given to RT packet with reference to this table at the time of request sending acceptance. Since a sequence number is not given to a NRT packet, this table is not used at the time of NRT packet Request-to-Send acceptance.
[0096]A sequence number management table consists of a receiving node MAC address field (801), a sequence number (802), and the buffer queue pointer field (803). When each entry of this table transmits RT packet to a receiving node stored in a receiving node MAC address field (801), it shows that a sequence number stored in the sequence number field (802) should be given. RT packet which transmitted prepares for request sending from a next sequence number inspection module, and are buffered by buffer queue (804) specified by the buffer queue pointer field (803). [a fixed number of]
[0097]When RT Request to Send and a NRT Request to Send are received from a transmitting control module (108) to drawing 9, a format of a packet received [is combined and] and passed is shown. It consists of a MAC header field, and (901) and the data division field (902) as illustrated.
[0098]A packet format at the time of transmitting a packet to a wireless network from a sequence number grant module (110) is shown in drawing 10. Also when publishing request sending from a sequence number inspection module (111), this packet format is used so that it may mention later. The packet kind field (1001) and the sequence number field (1002) are inserted between a MAC header field (901) and the data division field (902) as illustrated. Data which can distinguish whether it is a packet for the packet concerned to publish RT packet, a NRT packet, and request sending is stored in the

packet kind field. The sequence number field (1002) is used only when the packet concerned is a RT packet.
[0099]An operation flow of a sequence number grant module (110) is shown in drawing 11.
[0100]At Step 1101, it is distinguished from a transmitting control module (108) whether RT Request to Send was received. When RT Request to Send is received, when that is not right to Step 1102, to it, it jumps at Step 1106.
[0101]At Step 1102. An entry of a sequence number management table (800) corresponding to a receiving node MAC Address (MAC Address specified as a transmission destination of a packet) stored in a MAC header (901) of RT packet which received from a transmitting control module (108) and was passed is searched.
[0102]At Step 1103, the packet kind field (1001) and the sequence number field (1002) which were shown at drawing 10 are given to RT packet. A value of the sequence number field (802) of an entry which searched with Step 1102 data in which it is shown that it is "RT packet" in the sequence number field is stored in the packet kind field.
[0103]A value of the sequence number field used at Step 1103 by Step 1104 is **********ed.
[0104]A buffer which copied the contents of the packet to a buffer and was made at Step 1105 as a result of a copy is connected to a buffer queue (804) specified in the buffer queue pointer field (803) of an entry currently searched with Step 1102. When buffer queue length furthermore becomes more than fixed at this time, the dequeue of the buffer connected most for many years is carried out. It jumps to Step 1109 after this processing.
[0105]It is distinguished whether at Step 1106, a NRT Request to Send was published from a transmitting control module (108). When a NRT Request to Send is received, when that is not right to Step 1107, to it, it jumps at Step 1108.
[0106]The packet kind field (1001) and the sequence number field (1002) are given to a NRT packet which received from a transmitting control module (108) and was passed at Step 1107. Under the present circumstances, data in which it is shown that it is a "NRT packet" is stored in the packet kind field. Since the sequence number field does not have a meaning, a special value is not set up. It jumps to Step 1109 after this processing.
[0107]It is distinguished whether at Step 1108, request sending was published from a transmitting control module (108). If request sending is published, if that is not right to Step 1109, abnormal termination will be carried out to it.
[0108]A packet which it has generated as a result of execution of Step 1105, or has generated as a result of execution of Step 110, or received from a transmitting control module (108) and was passed at Step 1109 is transmitted to a receiving node.
[0109]next, operation of a sequence number grant module (110) at the time of receiving request sending from a sequence number inspection module (111) is detailed -- per -- it explains.
[0110]A packet format used in order to receive request sending from a sequence number inspection module (111) to drawing 12 is shown. This packet format is the same as that of drawing 10 as explanation of drawing 10 also described. Data in which it is shown that it is the packet currently used when the packet concerned publishes request sending is stored in the packet kind field (1001). A value which specifies the range of a sequence number of a packet which performs request sending as the sequence number field (1002) and the last sequence number field (1201) is stored.

[0111]An operation flow at the time of receiving request sending from a sequence number inspection module is shown in drawing 13.
[0112]A buffer queue connected to a sequence number management table (800) is first searched with Step 1301, It is inspected whether a buffer holding a sequence number specified in the sequence number field (1002) and the last sequence number field (1201) is connected to a buffer queue (804).
[0113]When connected, request sending of the buffer concerned is published to a transmitting control module (108) at Step 1302.
[0114]Lessons is taken from the last in detail [operation of a sequence number inspection module (111)], and it explains to it using drawing 14 and drawing 15. When a packet is received from a sequence number grant module (109), this module is started as shown in drawing 1.
[0115]A sequence number inspection module (111) inspects a sequence number using a sequence number inspection table (1400) shown in drawing 14. This table manages the newest sequence number of RT packet which received for every transmission node. By inspecting a sequence number registered into this table, and a sequence number of a receive packet, it is distinguished whether a lack packet exists.
[0116]This table consists of a transmission node MAC address field (1401), the sequence number field (1402), the request sending issue time field (1403), and the buffer queue pointer field (1404). The directions for each field are clarified by drawing 15.
[0117]Lessons is taken from drawing 15 in detail [operation which is a sequence number inspection module (111)], and it explains to it.
[0118]With reference to the packet kind field (1001) of a packet which received at Step 1501, it is distinguished whether the packet concerned is a RT packet. In being RT packet, when that is not right to Step 1502, to it, it jumps at Step 1508.
[0119]An entry of a sequence number inspection table (1400) with a value of a transmission node MAC address field (1401) which is in agreement with a MAC Address (it exists in a MAC header part (901)) of a transmission node of RT packet which received is searched with Step 1502.
[0120]It is distinguished whether a value of the sequence number field (1402) of an entry currently searched with Step 1503 at Step 1502 and the sequence number field (1002) of a receive packet is compared, and a missing packet exists. When a missing packet exists, it jumps to step 1504 **, and when that is not right, it jumps to Step 1506.
[0121]At Step 1504, current time is compared with a value of the request sending issue time field (1403) of an entry currently searched with Step 1502, and it is judged whether the difference is beyond constant value. Time which published request sending immediately before is stored in a request sending time field so that it may state just in the back. If it is beyond constant value, if that is not right to Step 1506, to it, it will jump at Step 1505.
[0122]The ENQ of the packet which received at Step 1505 is carried out to a buffer queue (1405). A value of the buffer queue pointer field (1404) of an entry currently searched with Step 1502 can determine a buffer queue which should be carried out an ENQ. Request sending of a missing packet is transmitted to a sequence number grant module. The present time is stored in the request sending issue time field (1403). Processing is completed at this step.
[0123]The dequeue of the buffer group is carried out from a buffer queue (1405)

specified in the buffer queue pointer field (1404) of an entry currently searched with Step 1506 at Step 1502. A value of the sequence number field (1402) of the entry concerned is updated to a value of the sequence number field of a packet which received.
[0124]At Step 1507, advice of receipt is published to RT communication protocol stack (106). Under the present circumstances, a packet group which carried out the dequeue, and a receive packet are also collectively delivered at Step 1506. Processing is completed at this step.
[0125]At Step 1508, advice of receipt is published to a NRT communication protocol stack (107). Under the present circumstances, a packet which received is also delivered collectively. Processing is completed at this step.
[0126]The following effects can be acquired by an embodiment of this invention.
[0127]1) A band management server has managed the total traffic volume which flows on a shared type wireless network. And each transmission node which is going to transmit a packet on a transmission line is demanding a band assignment demand which is different by a usual object for RT packets and an object for resending packets of a band management server. That is, even if occurrence frequency of a resending packet fluctuates, a transmission rate of the usual RT packet is not fluctuated. Therefore, quality multimedia data transfer is realizable.
[0128]2) Between transceiver nodes, although a retransmitting process is performed about RT packet, don't perform a retransmitting process about a NRT packet. According to occurrence frequency of request sending, a change in a zone for resending packets is required of a band management server. Therefore, even if quality of a transmission line changes with time, effective use of a zone is realizable.
[0129]3) An embodiment of this invention is realizable by incorporating a transmitting control module, a sequence number grant module, and a sequence number inspection module in OS. That is, in portions other than OS, and a concrete target, they are ART communication protocol stack and a NRT communication protocol stack (usually provided in a form of a library).
B) A communication method shown by an embodiment of this invention can be realized, without adding change of transmitting application and receiving application.
[0130]
[Effect of the Invention]By this invention, the quality of a transmission line is bad and the quality of a transmission line becomes realizable about quality media data transfer in the share bus type network which changes with time.